The Concentration Combination, Year III

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The Concentration Combination: Year III, investigated whether the combination of a spherical luminescent solar concentrator (LSC) and cylindrical solar water heater (SWH) was more efficient than the spherical combination of a luminescent solar concentrator and solar water heater and the cylindrical combination of a luminescent solar concentrator and solar water heater. It was hypothesized that the spherical LSC/cylindrical SWH would be more efficient than both the cylindrical LSC-SWH and the spherical LSC-SWH. Upon creating three concentrators, it was found that the combination of the spherical luminescent solar concentrator and cylindrical solar water heater was more efficient than the cylindrical LSC-SWH in heating water by 13 times and more efficient than the spherical LSC-SWH by 196 times. It was also determined to be more efficient in producing electricity than the cylindrical LSC-SWH by 17 times, although it was no more efficient in producing electricity than the spherical LSC-SWH. The statistical significance between these data was later tested and confirmed by a t-test. As a result, the hypothesis was rejected. Even though the hypothesis was rejected, the overall goal of the past three years of research was fulfilled: to combine luminescent solar concentration and solar water heating in the most optimal way so that the electrical and solar water heating are optimized through the manipulation of the shape of the concentrator.

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